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(54) Abstract Title

**Mobile phone battery set with replaceable SIM card mounting board**

(57) A mobile phone battery set 2 with a replaceable SIM card mounting board 20 mounted with at least two SIM cards thereon includes a battery retaining housing provided with a plurality of metal contacts and having an open window area. A SIM card mounting board 20 is slidably mounted on the open window area of the battery retaining housing along a guiding mechanism 26a, 26b. A raised platen 21 is formed on the SIM card mounting board 20 and is provided with a plurality of signal contacts 211 corresponding to the signal contacts of a master SIM card receiving chamber of the mobile phone. At least two expanded SIM card receiving chambers 22, 23 are formed on the SIM card mounting board 20. Each of the expanded SIM card receiving chambers 22, 23 is configured to hold a SIM card 31, 32 therein and is provided with a plurality of signal contacts electrically coupled to the signal contacts 211 arranged on the raised platen 21.

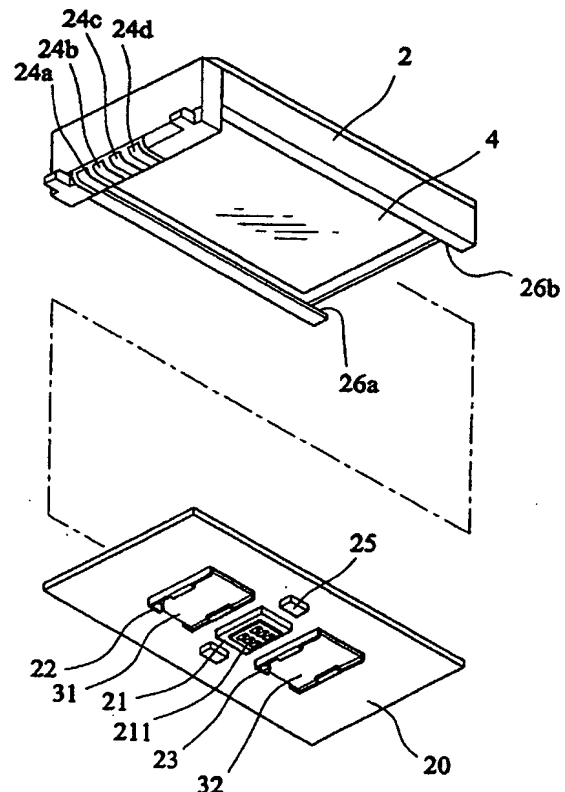


FIG.3

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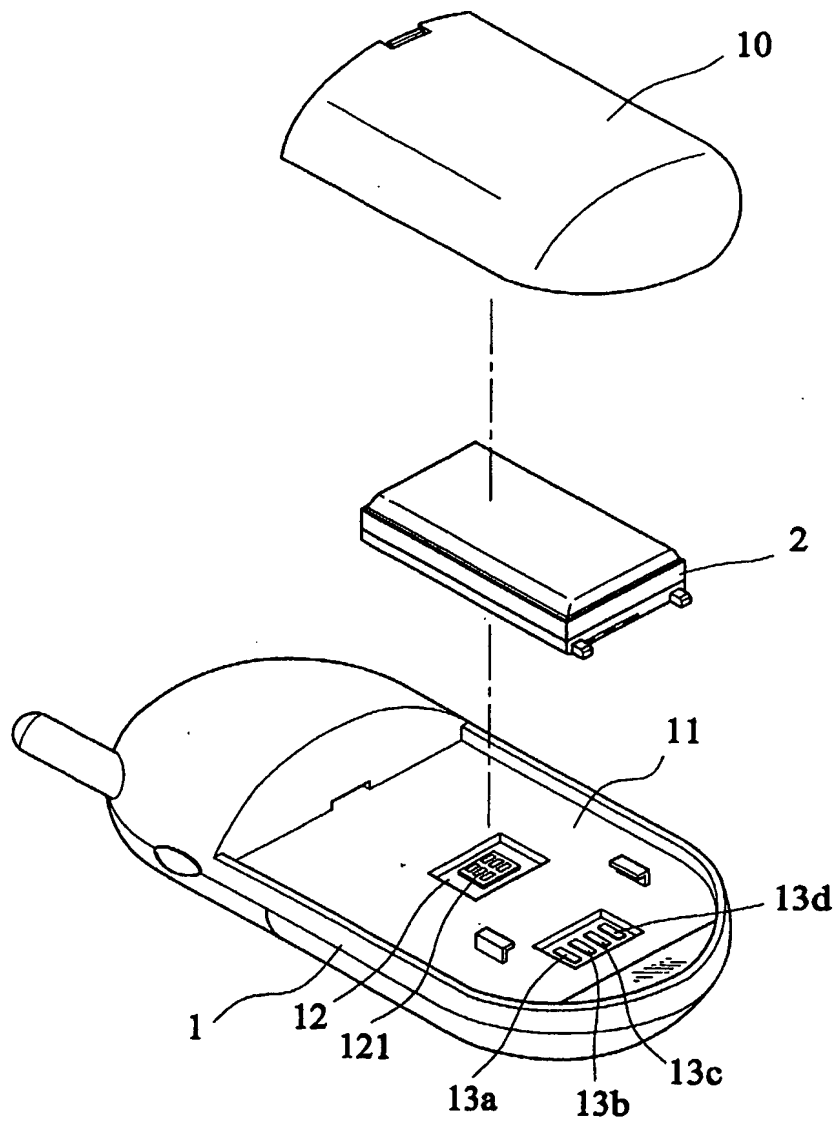


FIG.1

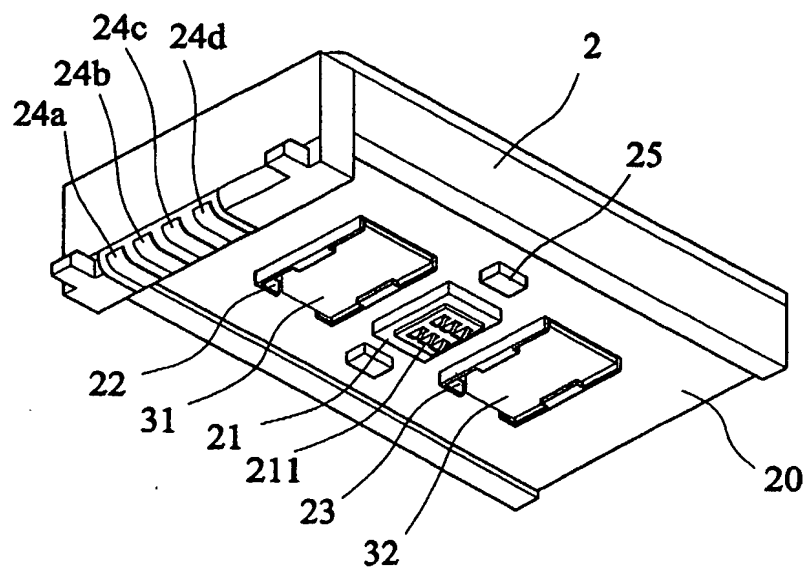


FIG. 2

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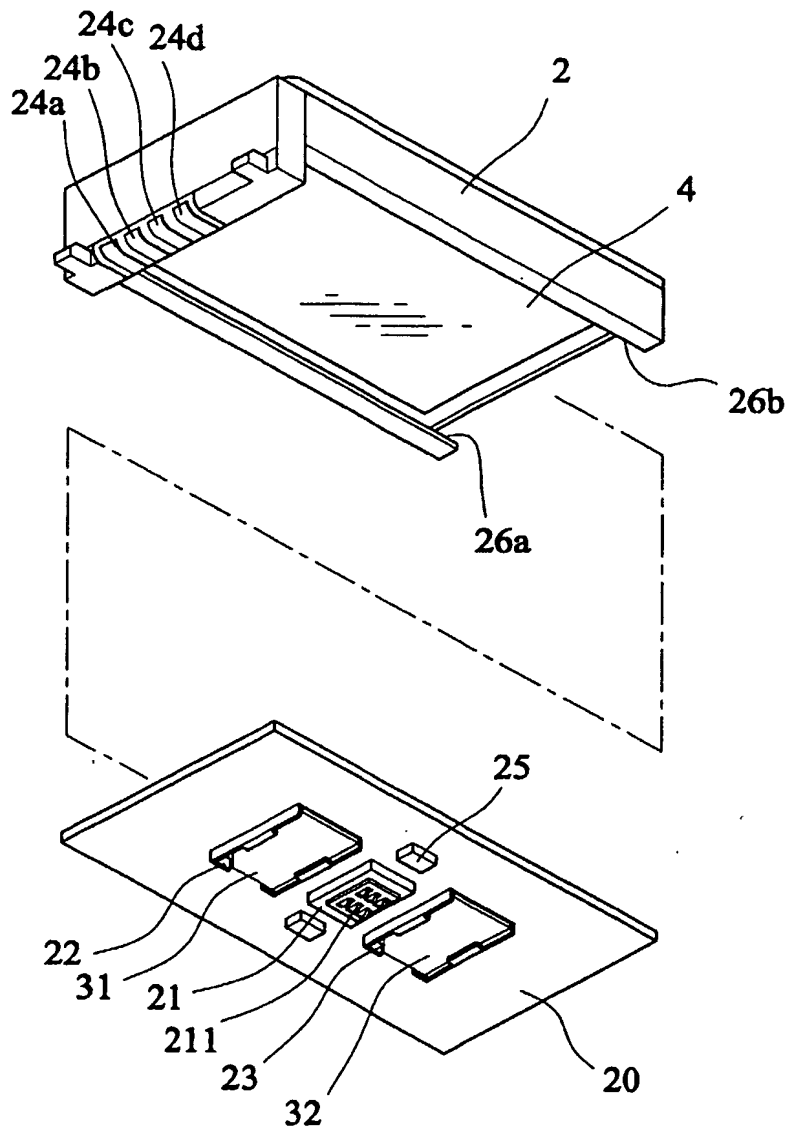
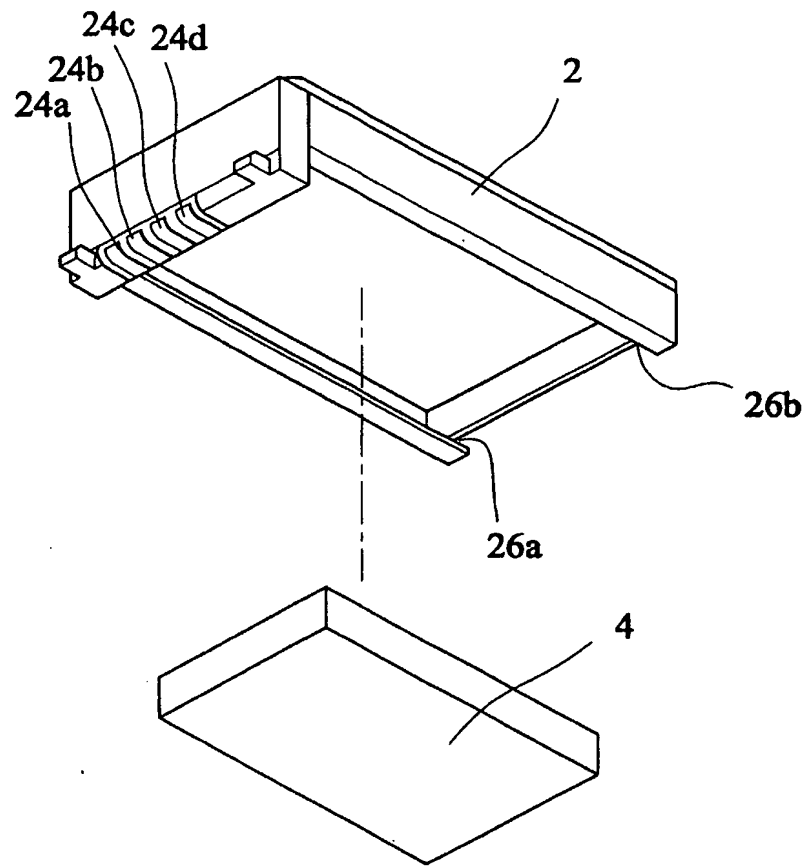


FIG.3

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**FIG.4**

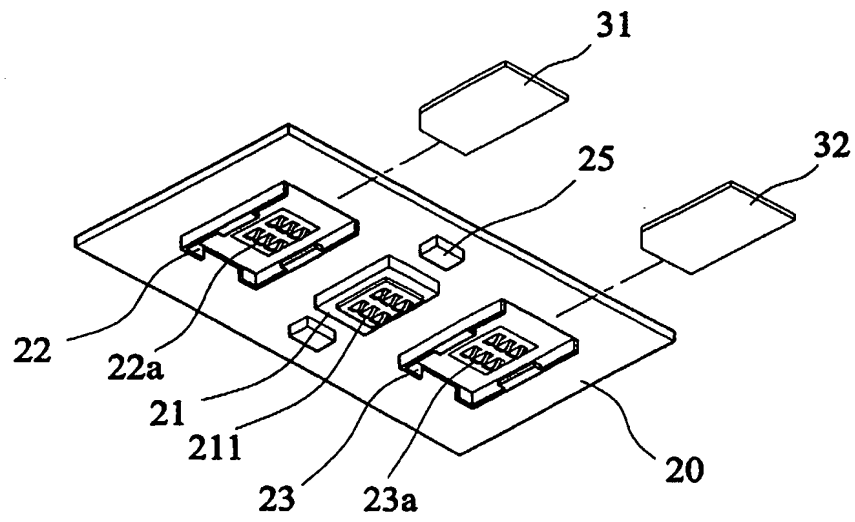


FIG. 5

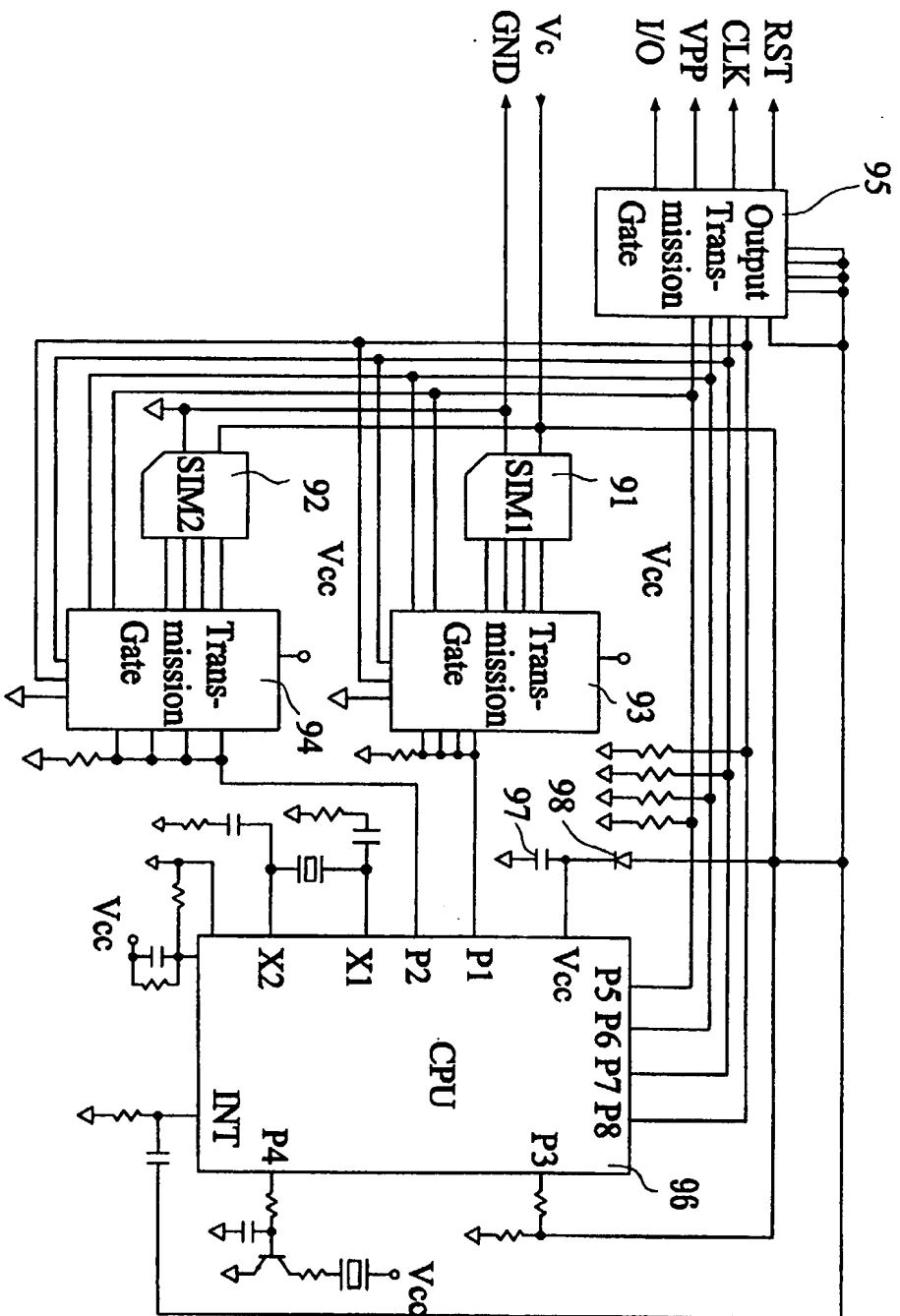


FIG. 6

# **MOBILE PHONE BATTERY SET WITH REPLACEABLE SIM CARD MOUNTING BOARD**

## **BACKGROUND OF THE INVENTION**

### **1. Field of the Invention**

The present invention generally relates to a mobile phone battery set, and in particular to a battery set with a replaceable SIM card mounting board mounted with at least two SIM cards thereon.

### **2. Description of the Prior Art**

In the modern society, mobile phones are wildly used in communications. The mobile phone system comprises two main systems, one is Global System for Mobile Communications, abbreviated GSM, and the other is Analog Mobile Phone System, abbreviated AMPS. Nowadays GSM is the most wildly used system in mobile phone communications.

Conventionally, a battery receptacle is formed on the back of the mobile phone for receiving a battery set. A Subscriber Identity Module Card, abbreviated SIM card, receiving chamber is formed in a suitable place on the battery receptacle for holding a small SIM card. There are a number of conductive contacts arranged in the SIM card receiving chamber for contacting with a set of SIM card contacts arranged on the SIM card and the signals therebetween will be electrically connected.

When using a mobile phone for communications, the mobile phone will register with the network of the service provider through reading the records of the SIM card and then the communication services may be used in the network.

However, there are so many service providers and the frequency of the communication systems they supply are not all the same, such as GSM 900, GSM 1800, and GSM1900. More and more additional mobile phone services are provided, such as fax, e-mail, stock market information, and bank



service, for making life more easy and convenient. So the mobile phone user will have plural SIM cards with different frequency from separated service providers for selecting varied service they need.

For example, when selecting a special service from one service provider, the user must change to the SIM card from the specific service provider. When switching the SIM cards, the user needs to switch off the mobile phone, remove the battery set, take out the SIM card inside, insert the SIM card from the specific service provider, fit the battery set, and switch on for registering with network. It is so inconvenient and complicated to change the SIM card, and the SIM cards may be easily lost, damaged, or broken with the troublesome switching steps.

Each mobile phone executes all the work with the electric power supplied by the battery set. That means, everyone who uses a mobile phone is not simply carrying a mobile phone, but an accompanying power source with him. However, conventional battery set is only designed to supply the electric power, without any additional functions. Thus, if making good use of the accompanying power source, such as arranging a replaceable functional board on the battery set, the battery set will not only supply the electric power but also additional function to make the mobile phone may be used more conveniently and variously.

It is thus desirable to provide a mobile phone battery set with multiple SIM cards, so that the user can select one of the SIM cards easily and quickly for overcoming the problems mentioned above, making the use of mobile phone communication be more convenient and easy.

## **SUMMARY OF THE INVENTION**

Accordingly, the primary object of the present invention is to provide a mobile phone battery set with a replaceable SIM card receiving board. Plural SIM cards may be held on the replaceable board, so that the user may enjoy various services provided from different service providers easily and conveniently by one mobile phone. The user may choose one of the SIM cards held on the replaceable board being electrically connected to the mobile

phone for communications.

## **BRIEF DESCRIPTION OF THE DRAWINGS**

The present invention will be apparent to those skilled in the art by reading the following description of preferred embodiments thereof, with reference to the accompanying drawings, in which:

Figure 1 is an exploded view showing a battery set being separated from a mobile phone in accordance with the present invention;

Figure 2 is a perspective view of a bottom side of the battery set in Figure 1 in accordance with the present invention;

Figure 3 is an exploded view showing a replaceable SIM card receiving board being separated from the battery set in accordance with the present invention;

Figure 4 is an exploded view showing a battery being separated from the battery set in accordance with the present invention;

Figure 5 is an exploded view showing the SIM cards being separated from the SIM card receiving chambers formed on the replaceable SIM card receiving board in accordance with the present invention; and

Figure 6 is a control circuit diagram of the present invention.

## **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

Figure 1 shows a battery set being separated from a mobile phone in accordance with the present invention. A battery receptacle 11 is formed on a backside of the mobile phone 1 for receiving a battery set 2 thereon. The battery receptacle 11 may be further provided with a back cover 10 to cover and protect the battery set 2.

There is a master SIM card receiving chamber 12 formed in a suitable place on the battery receptacle 11 and a number of signal contacts 121 are arranged inside the SIM card receiving chamber 12. The battery receptacle 11 further comprises a plurality of metal contacts 13a, 13b, 13c, and 13d.

With reference to Figure 2, it is a front and bottom perspective view of the battery set 2 shown in Figure 1. A SIM card mounting board 20 is replaceable arranged on the bottom side of the battery set 2. A raised platen 21 is formed on the SIM card mounting board 20, corresponding to the master SIM card receiving chamber 12 formed on the battery receptacle 11 of the mobile phone 1. A number of signal contacts 211 are arranged on the raised platen 21 corresponding to the signal contacts 121 of the master SIM card receiving chamber 12. Two expanded SIM card receiving chambers 22 and 23 are formed on the opposite sides of the raised platen 21 for holding two SIM cards 31 and 32 respectively.

When the battery set 2 is received inside the battery receptacle 11, the signal contacts 211 set on the raised platen 21 will contact with the corresponding signal contacts 121 in the master SIM card receiving chamber 12. At the same time, the metal contacts 24a, 24b, 24c, and 24d arranged on the bottom side of the battery set 2 will contact with the corresponding metal contacts 13a, 13b, 13c, and 13d arranged on the battery receptacle 11.

Besides, the SIM card mounting board 20 is arranged with integrated circuit elements 25 and other necessary electronic components for executing specific controlling function.

Figure 3 shows the SIM card mounting board 20 in Figure 2 being separated from the battery set 2 in accordance with the preferred embodiment of the present invention. The battery set 2 is formed with two guiding slots 26a and 26b on inner side walls thereof and an open window area is formed between the side walls, so that the SIM card mounting board 20 may be slid onto the open window area of the battery set 2 along the guiding slots 26a and 26b. The guiding slots 26a and 26b serve as a guiding mechanism for guiding and locating the SIM card mounting board onto the battery set 2 in accordance with a preferred embodiment of the present invention.

In this embodiment, the guiding slots 26a and 26b are formed along a longitudinal axis of the battery set 2, as shown in Figure 3. It is to be understood that the guiding slots are possible to be formed along a latitudinal axis of the battery set. In alternative, the guiding mechanism of the present invention may be a mounting mechanism or locking mechanism adapted to

locate the SIM card mounting board 20 onto the battery set 2.

A retaining space is formed inside the battery set 2 for retaining a battery 4 therein. Figure 4 is an exploded view showing the battery 4 being separated from the battery set 2. The battery 4 may supply electric power to the mobile phone 1.

With reference to Figure 5, the two inner side walls of each SIM card receiving chambers 22 and 23 are formed with a guiding slot respectively, thereby the SIM cards 31 and 32 may slide into the SIM card receiving chambers 22 and 23 respectively through the guiding of the guiding slots. A number of conductive contacts 22a and 23a are arranged inside the SIM card receiving chambers 22 and 23 respectively for contacting with the corresponding conductive contacts (not shown) arranged on the SIM cards 31 and 32.

The drawings mentioned above only show two SIM card receiving chambers on the SIM card mounting board 20 for holding two SIM cards, but in practical applications, more than two SIM cards may be held thereon.

Figure 6 is a logical circuit diagram of the present invention. The control circuit mainly includes a first SIM card 91(SIM1), a second SIM card 92(SIM2), a first transmission gate 93, a second transmission gate 94, an output transmission gate 95, and a processing unit 96. It is known that the SIM card of a mobile phone typically includes six signal terminals RST、CLK、VPP、I/O、Vc、and GND. The power source terminals Vc and GND are electrically connected together. The signal terminals RST、CLK、VPP、I/O of each SIM card are electrically connected via the first transmission gate 93 and 94 respectively and then connected to the output transmission gate 95. The signal terminals RST、CLK、VPP、I/O of each SIM card are also electrically connected to signal terminals P5, P6, P7, and P8 of the processing unit 96.

In such a circuit arrangement, the processing unit 96 is capable of selecting one of the SIM card 91 or 92 by sending actuating signals to the transmission gates 93 and 94 via its output ports P1 or P2. Only one SIM card is electrically connected to the mobile phone at each time.

A bi-directional transmission gate, such as IC 4066, may be adopted as

the transmission gates 93, 94 and the output transmission gate 95. A widely used single-chip microprocessor, such as IC 8052, may be used as the processing unit 96 of the control circuit in the present invention.

In a preferred embodiment of the present invention, the power source  $V_c$  from the mobile phone is first supplied to both SIM cards 91 and 92, and then the power source  $V_c$  is supplied to a power source terminal  $V_{cc}$  of the central processing unit 96 via a time delay circuit composed of a capacitor 97 and a diode 98 connected in series. In addition, the power source  $V_c$  is supplied to an interrupt signal input terminal INT of the central processing unit 96. The capacitor 97 of the time delay circuit is capable of keeping electric power energy for a predetermined time period when the power source  $V_c$  is terminated. So, when the user turns on a power switch of the mobile phone, the first SIM card 91 will be electrically connected to the mobile phone via the output bi-directional transmission gate 95. Alternatively, when the user turns off the power switch of the mobile phone and then turns on the power switch within a predetermined time period, such as 5 seconds, the second SIM card 92 will be electrically connected to the mobile phone via the output bi-directional transmission gate 95.

Although the present invention has been described with respect to the preferred embodiments, it is contemplated that a variety of modifications, variations and substitutions may be done without departing from the scope of the present invention that is intended to be defined by the appended claims.

**I CLAIM:**

1. A mobile phone battery set adapted to be mounted on a battery receptacle of a mobile phone, the battery receptacle being provided with a plurality of power source contacts arranged thereon and a plurality of signal contacts arranged in a master SIM card receiving chamber formed on the battery receptacle, comprising:
  - a battery retaining housing having two side walls for retaining a plurality of battery cells therein, provided with a plurality of metal contacts corresponding to the power source contacts arranged on the battery receptacle of the mobile phone, and having an open window area;
  - a guiding mechanism formed on the open window area of the battery retaining housing;
  - a SIM card mounting board slidably mounted on the open window area of the battery retaining housing along the guiding mechanism;
  - a raised platen formed on the SIM card mounting board, a plurality of signal contacts being arranged on the raised platen corresponding to the signal contacts of the master SIM card receiving chamber of the mobile phone; and
  - at least two expanded SIM card receiving chambers formed on the SIM card mounting board, each of which being configured to hold a SIM card therein and provided with a plurality of signal contacts electrically coupled to the signal contacts arranged on the raised platen.
2. The mobile phone battery set as claimed in Claim 1, wherein the guiding mechanism comprises two guiding slots integrally formed on the side walls of the battery retaining housing for guiding the SIM card mounting board onto the open window area.
3. A mobile phone battery set substantially as hereinbefore described with reference to and as shown in the accompanying drawings.



INVESTOR IN PEOPLE

**Application No:** GB 0015031.8  
**Claims searched:** 1 to 3

**Examiner:** John Donaldson  
**Date of search:** 12 September 2001

## **Patents Act 1977**

### **Search Report under Section 17**

#### **Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK CI (Ed.S): G4M(MBA, MBF)

Int CI (Ed.7): G06K 7/00, 7/01, 7/04, 7/06, 17/00; H04M 1/00, 1/02, 1/03

Other: Online:WPI, EPODOC, JAPIO

#### **Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
A, E	GB 2356275 A (CHINA-HK), see abstract	-

X Document indicating lack of novelty or inventive step  
Y Document indicating lack of inventive step if combined with one or more other documents of same category.

& Member of the same patent family

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P Document published on or after the declared priority date but before the filing date of this invention.  
E Patent document published on or after, but with priority date earlier than, the filing date of this application.